JC820 U.S. PTO
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PATENT
Docket No. 1961-PAT

Box Patent Application
Commissioner of Patents and Trademarks
Washington, D.C. 20231

JC886 U.S. PTO
09/576484
05/23/00

NEW APPLICATION TRANSMITTAL

Transmitted herewith for filing is the patent application of

Inventor(s): DAVID CAIDAR
ABRAHAM ELMALEH

WARNING: Patent must be applied for in the name(s) of the actual inventor(s) .37CFR 1.41 and 1.53(b).

For (title): FIBER OPTIC VIDEO TRANSMITTER AND RECEIVER SYSTEM

1. Type of Application

This new application is for a(n) (check one applicable item below):

☒ Original

☐ Design

☐ Plant

WARNING: Do not use this transmittal for a completion in the U.S. of an International Application under 35 U.S.C. 371(c)(4) unless the International Application is being filed as a divisional, continuation or continuation-in-part application.

NOTE: If one of the following 3 items apply, then complete and attach ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF A PRIOR U.S. APPLICATION CLAIMED and a NOTIFICATION IN PARENT APPLICATION OF THE FILING OF THIS CONTINUATION APPLICATION.

☐ Divisional

☐ Continuation

☐ Continuation-in-part (CIP)

CERTIFICATION UNDER 37 CFR 1.10

I hereby certify that this New Application Transmittal and the documents referred to as enclosed therein are being deposited with the United States Postal Service on this date _____ in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number _____ addressed to the: Commissioner of Patents and Trademarks, Washington, D.C. 20231

_____
(Type or print name of person mailing paper

_____
(Signature of person mailing paper)

NOTE: Each paper or fee referred to as enclosed herein has the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 CFR 1.10(b).

2. Benefit of Prior U.S. Application(s)(35 USC 120)

NOTE: If the new application being transmitted is a divisional, continuation or a continuation-in-part of a parent case, or where the parent case is an International Application which designated the U.S., then check the following item and complete and attach ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

☐ The new application being transmitted claims the benefit of prior U.S. applications(s) and enclosed are ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

3. Papers Enclosed Which Are Required For Filing Date Under 37 CFR 1.53(b) (Regular) or 37 CFR 1.53 (Design) Application

13 Pages of specification
7 Pages of claims
1 Pages of Abstract
4 Sheets of drawing

☒ formal

☐ informal

WARNING: DO NOT submit original drawings. A high quality copy of the drawings should be supplied when filing a patent application. The drawings that are submitted to the Office must be on strong, white, smooth, and non-shiny paper and meet the standards according to § 1.84. If corrections to the drawings are necessary, they should be made to the original drawing and a high-quality copy of the corrected original drawing then submitted to the Office. **Only one copy is required or desired.** Comments on proposed new 37 CFR 1.84. Notice of March 9, 1988 (1990 O.G. 57-62).

NOTE: "Identifying indicia such as the serial number, group and unit, title of the invention, attorney's docket number, inventor's name, number of sheets, etc., not to exceed 2 3/4 inches (7.0 cm.) in width may be placed in a centered location between the side edges within three fourths inch (19.1 mm.) of the top edge. Either this marking technique on the front of the drawing or the placement, although not preferred, of this information and the title of thee invention on the back of the drawings is acceptable." Proposed 37 CFR 1.84(1). Notice of March 9, 1988 (1090 O.G. 57-62).

4. Additional papers enclosed

☐ Preliminary Amendment

☐ Information Disclosure Statement (37 CFR 1.98)

☐ Form PTO-1449

☐ Citations

☐ Declaration of Biological Deposit

☐ Submission of "Sequence Listing," computer readable copy and/or amendment pertaining thereto for biotechnology invention containing nucleotide and/or amino acid sequence

☐ Authorization of Attorney(s) to Accept and Follow Instructions from Representative

☐ Special Comments

☐ Other

5. Declaration or oath

☒ Enclosed

executed by (check **all** applicable boxes)

☒ inventor(s).

☐ legal representative of inventor(s). 37 CFR 1.42 or 1.43

☐ joint inventor or person showing a proprietary interest on behalf of inventor who refused to sign or cannot be reached.

☐ this is the petition required by 37 CFR 1.47 and the statement required by 37 CFR 1.47 is also attached. See item 12 below for fee.

☐ Not enclosed.

WARNING: Where the filing is a completion in the U.S. of an International Application but where a declaration is not available or where the completion of the U.S. application contains subject matter in addition to the International Application, the application may be treated as a continuation or continuation-in-part, as the case may be, utilizing ADDED PAGE FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION CLAIMED.

☐ Application is made by a person authorized under 37 CFR 1.41(c) on behalf of all the above named inventor(s). (The declaration or oath, along with the surcharge required by 37 CFR 1.16(e) can be filed subsequently).

NOTE: It is important that all the correct inventor(s) are named for filing under 37 CFR 1.41(c) and 1.53(b).

☐ Showing that the filing is authorized. (Not required unless called into question. 37 CFR 1.41(d).)

6. Inventorship Statement

WARNING: If the named inventors are each not the inventors of all the claims, an explanation, including the owner-ship of the various claims at the time the last claimed invention was made, should be submitted.

The inventorship for all the claims in this application are:

☒ The same

or

☐ Are not the same. An explanation, including the ownership of the various claims at the time the last claimed invention was made,

☐ is submitted

☐ will be submitted.

7. Language

NOTE: An application including a signed oath or declaration may be filed in a language other than English. A verified English translation of the non-English language application and the processing fee of $130.00 required by 37 CFR 1.17(k) is required to be filed with the application or within such time as may be set by the Office. 37CFR 1.52(d).

NOTE: A non-English oath or declaration in the form provided or approved by the PTO need not be translated. 37 CFR 1.69(b).

☒ English

☐ non-English

☐ the attached translation is a verified translation. 37 CFR 1.52(d).

8. Assignment

☒ An assignment of the invention to OPTICOMM CORPORATION 6046 Cornerstone Court West, Ste. 209, San Diego, CA 92121

☐ is attached. A separate ☒ "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or ☐ FORM PTO 1595 is also attached.

☐ will follow

NOTE: "If an assignment is submitted with a new application, send two separate letters-one for the supplication and one for the assignment." Notice of May 4, 1990 (1114 O.G. 77-78).

9. Certified Copy

Certified copy(ies) of application(s)

COUNTRY	APPLICATION NUMBER	DATE FILED

from which priority is claimed

☐ is(are) attached.

☐ will follow.

NOTE: The foreign application forming the basis for the claim for priority **must** be referred to in the **oath** or **declaration**. 37 CFR 1.55(a) and 1.63.

NOTE: This item is for any foreign priority for which the application being filed directly relates. If any parent U.S. application or International Application from which this application claims benefit under 35 U.S.C. 120 is itself entitled to priority from a prior foreign application, then complete item 18 on the ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

10. **Fee Calculation (37 CFR 1.16)**

A. ☒ **Regular application**

**********CLAIMS AS FILED**********				
	Number Filed	**Number Extra**	**Rate**	**Basic Fee $690.00**
Total Claims	**18** **-20=**	0	**x $18.00**	-0-
Independent Claims	**3** **-3=**	0	**x $78.00**	-0-
Multiple Dependent Claim(s), if any			**$260.00**	

☐ Amendment canceling extra claims enclosed

☐ Amendment deleting multiple dependencies enclosed

☐ Fee for extra claims is not being paid at this time

NOTE: If the fees for extra claims are not paid on filing, they must be paid, or the claims canceled by amendment, prior to the expiration of the time period set for response by the Patent and Trademark Office in any notice of fee deficiency. 37 CFR 1.16(d).

Filing Fee Calculation $_____

B. ☐ **Design application**

($310.00--37 CFR 1.16(f))

Filing Fee Calculation $_____

C. ☐ **Plant application**

($480.00--37 CFR 1.16(g))

Filing fee Calculation $_____

11. **Small Entity Statement(s)**

☒ Verified Statement(s) that this is a filing by a small entity under 37 CFR 1.9 and 1.27 is(are) attached.

Filing Fee Calculation (50% of **A** or **B** above) $ 345.00

NOTE: Any excess of the full fee paid will be refunded if a verified statement and a refund request are filed within 2 months of the date of timely payment of a full fee. 37 CFR 1.28(a).

12. **Request for International-Type Search (37 CFR 1.104(d)** (complete, if applicable)

☐ Please prepare an international-type search report for this application at the time when national examination on the merits takes place.

13. Fee Payment Being Made At This Time

☐ Not Enclosed

☐ No filing fee is to be paid at this time. (This and the surcharge required by 37 CFR 1.16(e) can be paid subsequently.)

☒ Enclosed

☒	basic filing fee	$ 345.00
☒	recording assignment ($40.00; 37 CFR 1.21(h)(1)	$ 40.00
☐	petition fee for filing by other than the inventors or person on behalf of the inventor where inventor refused to sign or cannot be reached ($130.00; 37 CFR 1.47 and 1.17(h))	$
☐	for processing an application with a specification in a non-English language. ($130.00; 37 CFR 1.52(d) and 1.17(k))	$
☐	processing and retention fee $130.00; 37 CFR 1.53(d) and 1.21(l))	$
☐	fee for international-type search report ($40.00; 37 CFR 1.21(e)	$

NOTE: 37 CFR 1.21(l) establishes a fee for processing and retaining any application which is abandoned for failing to complete the application pursuant to 37 CFR 1.53(d) and this, as well as the changes to 37 CFR 1.53 and 1.78, indicate that in order to obtain the benefit of a prior U.S. application, either the basic filing fee must be paid or the processing and retention fee of § 1.21(l) must be paid within 1 year from notification under § 53(d).

Total fees enclosed $ 385.00

14. Method of Payment of Fees

☒ Check in the amount of $ 385.00

☐ Charge Account No._____ in the amount of $_____
A duplicate of this transmittal is attached.

NOTE: Fees should be itemized in such a manner that it is clear for which purpose the fees are paid. 37CFR 1.22(b).

15. Authorization to Charge Additional Fees

WARNING: If no fees are to be paid on filing, the following items should **not** be completed.

WARNING: Accurately count claims, especially multiple dependent claims, to avoid unexpected high charges, if extra claim charges are authorized.

☒ The Commissioner is hereby authorized to charge the following additional fees by this paper and during the entire pendency of this application to Account No. 07-1338 .

☒ 37 CFR 1.16(a), (f) or (g) (filing fees)

☒ 37 CFR 1.16 (b), (c) and (d) (presentation of extra claims)

NOTE: Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims canceled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 CFR 1.16(d), it might be best not to authorize the PTO to charge additional claim fees, except possibly when dealing with amendments after final action.

☒ 37 CFR 1.16(e) (surcharge for filing the basic filing fee and/or declaration on a date later than the filing date of the application)

☒ 37 CFR 1.17 (application processing fees)

WARNING: While 37 CFR 1.17(a), (b), (c) and (d) deal with extension of time under § 1.136(a), this authorization should be made only with the knowledge that: "Submission of the appropriate extension fee under 37 CFR 1.136*a) is to no avail unless a request or petition for extension is filed." (Emphasis added). Notice of November 5, 1985 (1060 O.G.27)

☐ 37 CFR 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 CFR 1.311(b).

NOTE: Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 CFR 1.31(b).

NOTE: 37 CFR 1.28(b) requires "Notification of any change in loss of entitlement to small entity status must be filed in the application...prior to paying, or at the time of paying...issue fee". From the wording of 37 CFR 1.28(b):(a) notification of change of status must be made even if the fee is paid as "other than a small entity" and (b) no notification is required if the change is to another small entity.

16. Instructions As To Overpayment

☐ credit Account No. 07-1338

☐ refund

Reg. No. 26,548

Frank D. Gilliam

SIGNATURE OF ATTORNEY

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Fax No. (858) 292-0905

FRANK D. GILLIAM
4565 Ruffner Street, Ste. 200
San Diego, California 92111

☐ **Incorporation by reference of added pages**

Check the following item if the application in this transmittal claims the benefit of prior U.S. application(s) (including an international application entering the U.S. stage as a continuation, divisional or C-I-P application) and complete and attach the ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED

☐ Plus Added Pages For New Application Transmittal Where Benefit Of Prior U.S. Application(s) Claimed
Number of pages added_____

☐ Plus Added Pages For Papers Referred To In Item 4 Above
Number of pages added_____

☐ Plus "Assignment Cover Letter Accompanying New Application"
Number of pages added_____

☒ **Statement Where No Further Pages Added**

If no further pages form a part of this Transmittal, then end this Transmittal with this page and check the following item

☒ This transmittal ends with this page.

Applicant or Patentee: DAVID CAIDAR and ABRAHAM ELMALEH Attorney's
Serial or Patent No.: _____ Docket No.: 1961-PAT
Filed or Issued: _____
For: FIBER OPTIC VIDEO TRANSMITTER AND RECEIVER SYSTEM

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS (37 CFR 1.9(f) AND 1.27 (c) - SMALL BUSINESS CONCERN

I hereby declare that I am

[XX] the owner of the small business concern identified below:
[ ] an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF CONCERN OPTICOMM CORPORATION
ADDRESS OF CONCERN 6046 Cornerstone Ct. West, Ste. 209, San Diego, CA 92122

I hereby declare that the above identified small business concern qualifies as a small business concern as defined in 13 CFR 121.3-18, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees under section 41(a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention, entitled FIBER OPTIC VIDEO TRANSMITTER AND RECEIVER SYSTEM
by inventors DAVID CAIDAR and ABRAHAM ELMALEH
described in

[XX] the specification filed herewith
[ ] application serial no. _____, filed _____
[ ] patent no._____, issued _____

If the rights held by the above identified small business concern are not exclusive, each individual, concern or organization having rights to the invention is listed below* and no rights to the invention are held by any person, other than the inventor, who could not qualify as a small business concern under 37 CFR 1.9(d) or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e). *NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

NAME_____
ADDRESS_____
[ ] INDIVIDUAL [ ] SMALL BUSINESS CONCERN [ ] NONPROFIT ORGANIZATION

NAME_____
ADDRESS_____
[ ] INDIVIDUAL [ ] SMALL BUSINESS CONCERN [ ] NONPROFIT ORGANIZATION

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF PERSON SIGNING DAVID CAIDAR

TITLE OF PERSON OTHER THAN OWNER PRESIDENT

ADDRESS OF PERSON SIGNING 6046 Cornerstone Court West, Ste. 209
San Diego, CA 92121

SIGNATURE _____ DATE May 11/2000

1961PAT

Inventors

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San Diego, CA. 92121

Abraham Elmaleh
6940 Weller Street
San Diego, CA 92122

Title of the Invention:

FIBER OPTIC VIDEO TRANSMITTER AND RECEIVER SYSTEM

FIBER OPTIC VIDEO TRANSMITTER AND RECEIVER SYSTEM

FIELD OF THE INVENTION

This invention relates to transmitters for sending uncompressed digital video signals from an originating device such as a digital video camera to a distant location, such as a studio or editing facility and receivers for receiving signals sent from a distant location.

BACKGROUND OF THE INVENTION

In the past, video cameras or other sources of video imagery produced analog signals that were passed on to monitors, editing stations, post production, etc. via coaxial cables. With the advent of digital video cameras, and other devices transmitting a high quality digital video signal, coaxial cables are often unsatisfactory. Significant signal degradation occurs when the distance between the source and the user of the signal is over 100 meters. Fiber optic systems have been used to transmit a variety of analog and digital signals. Typically, these signals involve a number of technologies, including broadcast quality video cameras, broadcast remote digital video broadcasting systems including drop distribution, post production point-to-point links, studio matrix digital video switching networks,

serial digital interface video transport for high definition television, high quality radiology and other medical systems, sports, special events, studio broadcast programming, etc.

Prior digital image transmitting systems have been quite limited and specialized. For example, Lang in U.S. Patent No. 5,164,839 describes a system for storing compressed digital video source information on magnetic media, then transmitting it to a remote VCR over a fiber optic cable. This system is limited in video rate transmission and degrades signal quality through compression.

Transmitting telephone signals via fiber optics is described by Schussler in U.S. Patent No. 4,441,180. A multiplexing system for simultaneously transmitting a number of signals over a fiber optic system is described by Bell in U.S. Patent No. 4,061,577. Kostreski, in U.S. Patent No. 5,534,912, describes a "video on demand" system which transmits video signals over fiber optics.

Prior systems such as these do not provide the ideal combination of functions that will provide transmission over longer distances without signal degradation and avoiding compression, will comply with requirements of serial digital interface (SDI), digital video broadcasting (DVB) and high

definition television (HDTV) systems and provide flexibility in furnishing a variety of data rates with automatic lock-on.

Thus, there is a continuing need for improved fiber optic cable transmitters and receivers for use with uncompressed digital signals from broadcast cameras and the like, which permits transmission up to about 350 meters with automatic cable equalization and a communications link up to about 40 kilometers without significant signal degradation, utilize an uncompressed digital signal for optimum quality, will automatically lock on any of a plurality of data rates, and provide status indicators for power regulation, signal strength, data rate and serial digital interface lock/unlock.

SUMMARY OF THE INVENTION

The above-noted capabilities, and others, are provided in accordance with this invention which, basically, includes a transmitter for receiving a digital video signal from a source, such as a video camera, and transmitting the signal via an optical fiber and a receiver for receiving the signal from the optical fiber and preparing the signal for use in any desired manner, such as broadcast transmission, editing, etc.

The transmitter basically comprises an equalizer which performs automatic gain control and cable matching to 75 ohms coaxial cable that receives an input signal from a source, such as a digital video camera via a standard 75 ohm coaxial cable. The equalized data signal is passed to a reclocker for synchronization, decoding and reclocking to predetermined standard signals. Synchronization, for the purposes of this application comprises stabilizing the clock, retiming data signals, correcting for incoming signal jitter, etc. and otherwise cleaning up the signal. The signal is then passed to a laser transmitter where a digital optical signal is introduced into a fiber optic cable.

Meanwhile, the equalized signal from the equalizer is passed to a signal level detector. A second output signal from the reclocker is passed to the data rate and level encoder, which activates a Circuit Board Indicator (CBI) driver to provide visual indiction of the data rate, signal level and power on or off. A 5v power regulator is included to provide power at that level to the system components.

The receiver basically comprises a laser detector that receives the encoded laser signal from the fiber optic converts it to an electrical signal and transmits the signal to a

reclocker for synchronization. The synchronized signal then goes to a 75 ohms Video Driver and then passed through coaxial cable to a monitor or other system that will use the signal. A 5v power regulator is also provided.Meanwhile, a second signal from the reclocker is passed to a data rate and lock encoder and CBI driver which will display a visual indication of operating parameters, including the data rate in use, and power on/off, whether the incoming signal is locked or unlocked.

The transmitter and receiver are each contained in a small module that can be easily secured to operating equipment, such a broadcast digital video camera or editing equipment. Alternatively, a plurality of modules may me mounted in a 19" rack for convenient operation and observation of the operating parameter indicators.

BRIEF DESCRIPTION OF THE DRAWING

Details of the invention, and of preferred embodiments thereof, will be further understood upon reference to the drawing, wherein:

Figure 1 is a block diagram of the fiber optic video transmitter of this invention;

Figure 2 is a block diagram of the fiber optic video receiver of this invention;

Figure 3 is a perspective view of the transmitter;

Figure 4 is an elevation view of the back of the transmitter;

Figure 5 is a perspective view of the receiver; and

Figure 6 is an elevation view of the back of the receiver.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS Figure 1 is a block diagram of the transmitter 10 for transmitting a video signal through a fiber optic.

A video signal from a source 12 such as a video camera is received via a conventional 75 ohm coaxial cable 14 or the like. That signal is passed to a cable equalizer 16, such as a Genlinx II GS9024 from the Gennum Corporation, Burlington, Ontario, Canada. Cable equalizer 16 is a high performance automatic cable equalizer capable of processing serial digital data rates from 30 to 622 Mb/s. Cable equalizer 16 receives either single-ended or differential serial data and outputs equalized differential signals at Positive Electrical Control Levels (PECL), e.g. 800 mV. Preferably, cable equalizer 16 provides up to 40dB of gain at 200 MHz, resulting in equalization of greater than 350m at

270Mb/s of Belden 8281 cable. The equalizer 16 also produces a signal level indicator.

A conventional test point 18 is preferably provided to allow testing of the eye signal.

The equalized signal from cable equalizer 16 is passed to serial digital reclocker 20, which automatically detects and locks onto the incoming differential signal. Reclocker 20 outputs a synchronized data signal which provides clock and data recovery for eliminating jitter, etc. Also, the laser driver is disabled if no proper clock and data are received.

Reclocker 20 may be operated in a manual mode where a particular data rate is specified or in an automatic mode in which the reclocker automatically cycles through the different SMPTE data rates and locks on to the correct one.

Reclocker 20 also produces a signal which indicates the data rate, which is processed in data rate and level encoder 22, as detailed below.

The synchronized signal from reclocker 20 passes to laser transmitter 24 where the electrical signal is converted to a corresponding laser signal and directed into fiber optic cable 25. A conventional automatic power control circuit is included to maintain a constant output power laser signal. While any suitable

laser transmitter may be used, the STX-12 from Optical Communication Products, Inc., Chatsworth, CA is preferred.Data rate and level encoder 22 receives a signal from reclocker 22, as mentioned above. A signal level detector 26 (typically an ICL7665CSA from the Maxim company) receives a an input signal from cable equalizer 16, detects and analyzes the level of the signal and passes that information on to data rate and level encoder 22, typically an MC1455B available from the Motorola company. Signals corresponding to the data rate and the degree of lock are passed from data rate and level encoder 22 to Circuit Board Indicator driver 23, typically a ULN2001A darlington array which drives a panel having a row of light emitting diodes (as seen in Figure 3) with indicia adjacent to each LED indicating the meaning of the lighted LED. One of the top five LEDs typically glows green when activated and shows the data rate, e.g. 143, 177, 270, 360 and 540 Mb/s in use.

Three LEDs 32 indicate the signal level. Typically the top LED 32 will show green when the signal level is at the optimum level. The central LED 32 will glow yellow, indicating a marginal, but generally useful, signal level. Bottom LED 32 will glow red to indicate no signal or an unacceptably low signal level.

A final LED 34 will glow green when the system is powered and will be off when power is off.

Preferably, the system is voltage power protected and works at 5 volts, as provided by power regulator 36 (typically a L7805CV from the Motorola company) which receives AC/DC power from power supply 38 at a voltage of 9 to 12V through conventional wiring (not shown, for clarity) to the various system components. Figure 2 is a block diagram of a receiver 38 for receiving information from fiber optic cable 25.

A laser carried signal from transmitter 10 is received at laser receiver 40 via fiber optic cable 25 where an electrical signal corresponding to the incoming signal is created. While any suitable laser receiver may be used, the SRX-12 from Optical Communications Products, Inc. is preferred. The signal is then passed to reclocker 42, typically a GENLINX II GS9035 from the Gennum corporation. Reclocker 42 includes a function selector that automatically detects and locks onto the incoming data signal. Information relating to the detected data rate and degree of lock are passed onto data rate and lock encoder 48, as described below.

The synchronized data signal from reclocker 42 is passed to a coaxial cable driver 52 (typically a GS9028 from the Gennum

Corporation) that is designed to drive at least one 75 ohm co-axial cable 54. The electrical data signal from cable 54 can be directed to any suitable equipment, such as a monitor, editing or post-production equipment, etc.Data rate and lock encoder 48 receives the data rate automatically selected at reclocker 42 and information showing the degree of lock and encodes that information for use by CBI driver 50. Typically, data rate and lock encoder 48 may be an MC14555B decoder/demultiplexer from Motorola.

CBI driver 50 typically includes a plurality of darlington array pairs to drive an LED display. CBI driver 50 may be a ULN2001AD device from SGS-Thomson Microelectronics. A plurality of LEDs are provided to indicate the data rate being used. Typically, five LEDs 56 are provided, each of which indicates one data rate from a typical set including data rates of 143, 177,270,360 and 540 Mb/s. Indica alongside each LED indicates which rate is symbolized by that LED. A second series 58 of LEDs indicates lock and unlock. Typically, lock will be indicated by a green LED, and unlock by a red LED.

A conventional power supply 62 furnishes 5 volt power to the other components, typically from a 12 volt input 64. A final LED 60, grouped with the other LEDs will indicate power on by,

typically, a green LED.Both transmitter 10 and receiver 40 preferably have the same general housing configuration. Figure 3 shows a perspective view of a housing 70 for a typical transmitter 10 while Figure 4 shows the back of housing 70. Housing 70 has side walls 72, preferably parallel, a back wall 74, preferably sloping for ease of access, and a front wall 76. Mounting flanges 78 are provided for mounting a plurality of housings 70 side-by-side in a rack. Alternatively, flanges 78 may be secured to a sidewall 72, parallel to the sidewall, for mounting on a professional video camera or the like. A coaxial cable connector 80 and a fiber optic cable connector 82 are provided on back face 74.

On the back surface, as seen in Figure 4, are located the various informational diodes, including data rate diodes 30, one of which will be lit to show one specific data rate, signal level diodes one of which will be lit to indicate high, medium or low signal level and a power LED 34 to indicate power on. Indica are provided alongside each LED to indicate the parameter being indicated, e.g. data rate numbers, "signal level", "power on", etc.

Figure 5 shows a perspective view of a housing 86 for a typical receiver 38 Housing 86 has side walls 88, preferably

parallel, a back wall 90, preferably sloping for ease of access, and a back wall 92. Mounting flanges 94 are provided for mounting a plurality of housings 86 side-by-side in a rack. Alternatively, flanges 94 may be secured to a sidewall 88, parallel to the sidewall, for mounting on a professional video camera or the like. A coaxial cable connector 96 is provided for the outgoing electrical signal on back face 90. A fiber optic cable connector 98 is provided for the incoming optical signal.

On the back surface, as seen in Figure 6, are located the various informational LEDs, including data rate LED 100, one of which will be lit to show one specific data rate, and lock and unlock diodes 102 one of which will be lit to indicate high lock or unlock and a power LED 104 to indicate power on. Indica are provided alongside each LED to indicate the parameter being indicated, e.g. data rate numbers, "lock", "power on", etc.

Altogether, this is a compact, efficient system which provides access to diagnostic and trouble shooting information through the LED array and test points.

Other applications, variations and ramifications of this invention will occur to those skilled in the art upon reading this disclosure. Those are intended to be included within the scope of this invention, as defined in the appended claims.

0 WE CLAIM:

1. A fiber optic video transmitter system, which comprises: input means for receiving a digital video signal from a coaxial cable;

a cable equalizer for receiving and equalizing said digital video signal from said input means and producing an equalized signal;

a reclocker for receiving and synchronizing said equalized signal to a predetermined standard signal and outputting a first synchronized data signal;

a laser transmitter means for receiving said first synchronized data signal, and producing a laser beam carrying the resulting data signal; and

means for directing said resulting data signal into a fiber optic cable for transmitting said first synchronized data signal.

2. The fiber optic video transmitter system according to claim 1 further including:

means for directing a second equalized signal from said cable equalizer;

a level detector for receiving said second equalized signal and detecting signal level;means for directing signal level output from said level detector and means for directing a second

synchronized data signal from said reclocker to a data rate and lock encoder;

said data rate and lock encoder including means for receiving said detected signal level output and said second synchronized data signal and providing visible indica showing data rate and signal status.

3. The fiber optic video transmitter system according to claim 2 wherein said visible indicia comprises a plurality of light emitting diodes.

4. The fiber optic video transmitter system according to claim 3 wherein a first set of said light emitting diodes comprises one light emitting diodes corresponding to each system data rate, and further including means for lighting a light emitting diode corresponding to the data rate in use.

5. The fiber optic video transmitter system according to claim 3 wherein a second set of three of said light emitting diodes and further includes means for lighting diodes corresponding to signal level.

6. The fiber optic video transmitter system according to claim 1 further including a power regulator for receiving 12 volt power and directing regulated 5 volt direct current power to

other system components and further including visible indicia for indicating that power is on.

7. A fiber optic video receiver system, which comprises:

input means for receiving a digital video signal from a fiber optic cable and outputting a corresponding electrical signal;

a reclocker for receiving and synchronizing said electrical signal to a predetermined standard signal and outputting a synchronized data signal; and

coaxial cable driver means for receiving said synchronized data signal and including means for directing said synchronized data signal into at least one coaxial cable.

8. The fiber optic video receiver system according to claim 7 further including:

means for directing a second synchronized signal from said reclocker;

a data rate and lock encoder for receiving said second equalized signal and producing an encoded data rate and lock signal; and

means for directing said encoded signal from said data rate and lock detector to a driver for producing visible indica showing data rate and signal status.

9. The fiber optic video receiver system according to claim 7 further including a power regulator for receiving 12 volt power and directing regulated 5 volt direct current power to other components and further including visible indicia for indicating that power is on.

10. The fiber optic video receiver system according to claim 8 wherein said visible indicia comprises a plurality of light emitting diodes.

11. The fiber optic video receiver system according to claim 10 wherein a first set of said light emitting diodes comprises one light emitting diodes corresponding to each system data rate, and further including means for lighting a diode corresponding to the data rate in use.

12. The fiber optic video receiver system according to claim 10 wherein a second set of three of said light emitting diodes and further includes means for lighting diodes corresponding to level of signal lock.

13. A fiber optic video transmitter and receiver system for transmitting video signals over long distances, which comprises:

a fiber optic video transmitter which comprises:

input means for receiving a digital video signal from a coaxial cable;

a cable equalizer for receiving and equalizing said digital video signal from said input means and producing an equalized signal;

a reclocker for receiving and synchronizing said equalized signal to a predetermined standard and outputting a first synchronized data signal;

a laser transmitter means for receiving said first synchronized data signal, and producing a laser beam carrying the resulting data signal; and

output means for directing said resulting data signal into a fiber optic cable for transmitting said first synchronized data signal; and

a fiber optic video receiver which comprises:

input means for receiving a digital video signal from said fiber optic cable and outputting a corresponding electrical signal;

a reclocker for receiving and synchronizing said electrical signal to a predetermined standard signal and outputting a synchronized data signal; and

coaxial cable driver means for receiving said synchronized data signal and including means for

directing said synchronized data signal into at least one coaxial cable.

14. The A fiber optic video transmitter and receiver system for transmitting video signals over long distances according to claim 13 wherein each of said fiber optic video receiver and transmitter further includes a power regulator for receiving 12 volt power and directing regulated 5 volt direct current power to other components and further including visible indicia for indicating that power is on.

15. The fiber optic video transmitter and receiver system for transmitting video signals over long distances according to claim 13 wherein said fiber optic video transmitter system further includes:

means for directing a second equalized signal from said cable equalizer;

a level detector for receiving said second equalized signal and detecting signal level;

means for directing signal level output from said level detector and means for directing a second synchronized data signal from said reclocker to a data rate and lock encoder;

said data rate and lock encoder including means for receiving said detected signal level output and said second

synchronized data signal and providing visible indica showing data rate and signal status.

16. The fiber optic video transmitter and receiver system for transmitting video signals over long distances according to claim 13 wherein said visible indicia comprises a plurality of light emitting diodes.17. The fiber optic video transmitter and receiver system for transmitting video signals over long distances according to claim 13 wherein said fiber optic video receiver further includes:

means for directing a second synchronized signal from said reclocker;

a data rate and lock encoder for receiving said second equalized signal and producing an encoded data rate and lock signal; and

means for directing said encoded signal from said data rate and lock detector to a driver for producing visible indica showing data rate and signal status.

18. The fiber optic video transmitter and receiver system for transmitting video signals over long distances according to claim 17 wherein said visible indicia comprises a plurality of light emitting diodes.

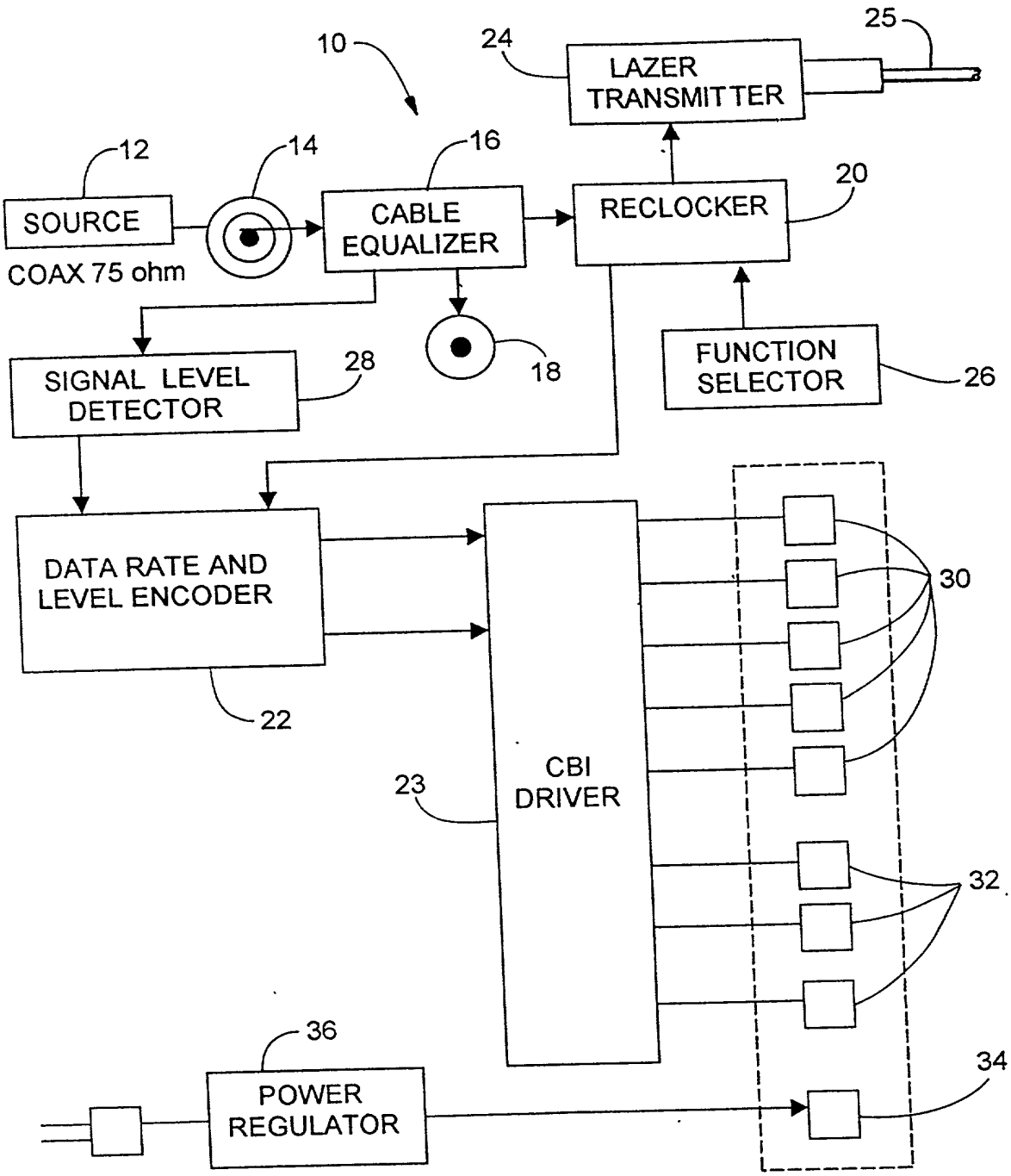
10
24
LAZER TRANSMITTER
25
12
14
16
20
SOURCE
COAX 75 ohm
CABLE EQUALIZER
RECLOCKER
18
SIGNAL LEVEL DETECTOR
28
FUNCTION SELECTOR
26
DATA RATE AND LEVEL ENCODER
22
CBI DRIVER
23
30
32
36
POWER REGULATOR
34

Figure 1

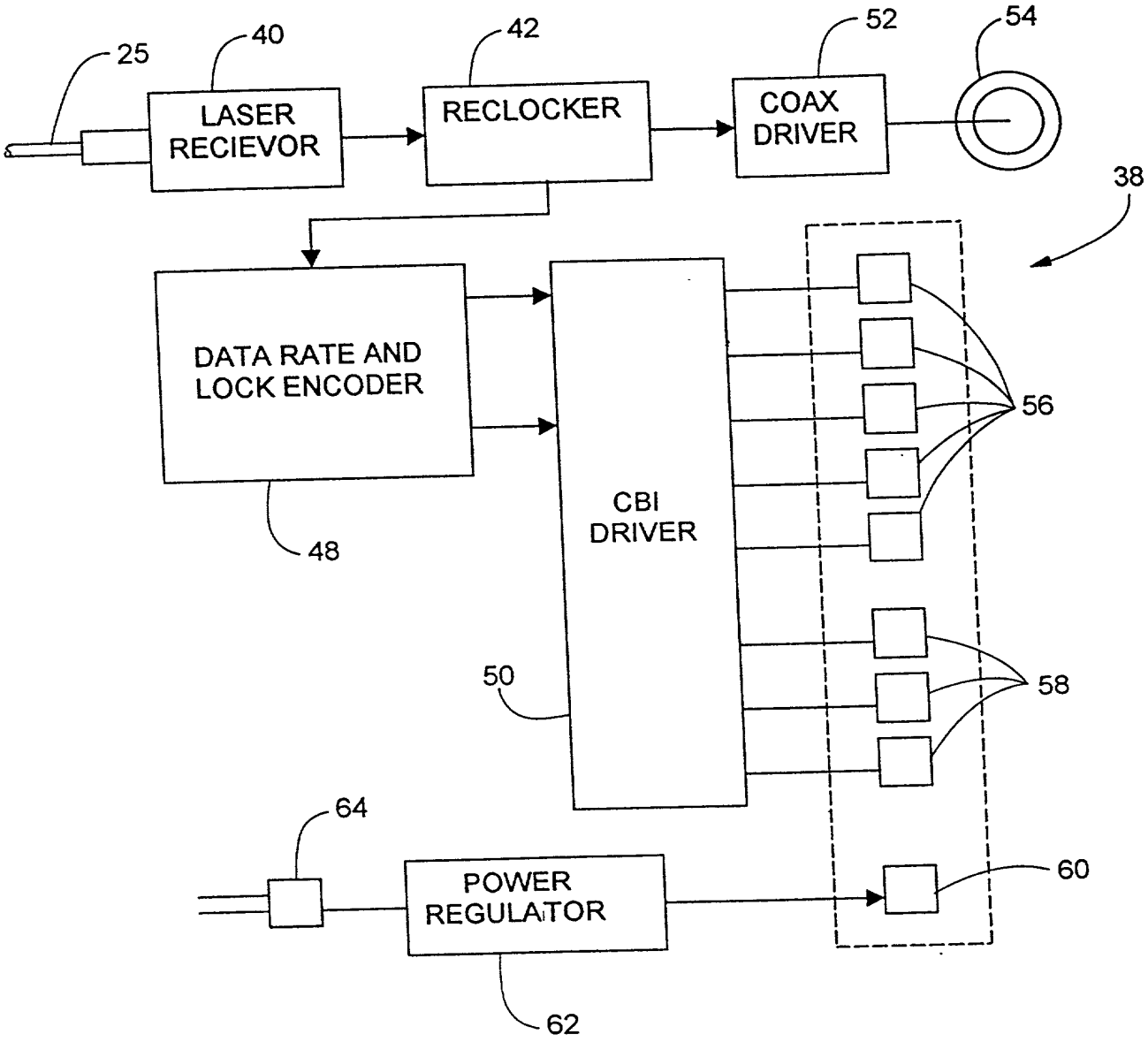
25
40
LASER
RECIEVOR
42
RECLOCKER
52
COAX
DRIVER
54
38
DATA RATE AND
LOCK ENCODER
48
CBI
DRIVER
56
50
58
64
POWER
REGULATOR
60
62

Figure 2

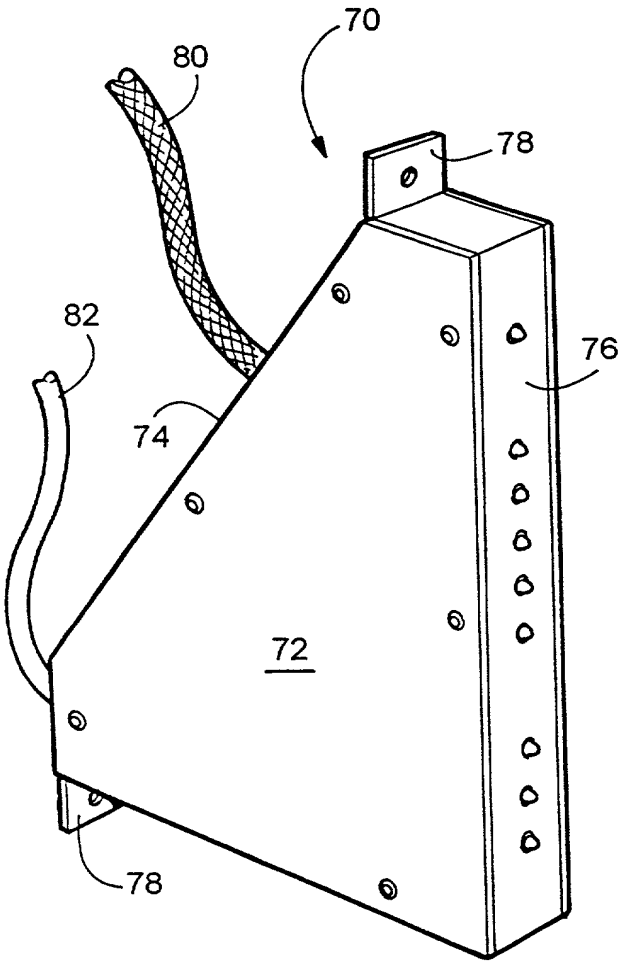

Figure 3

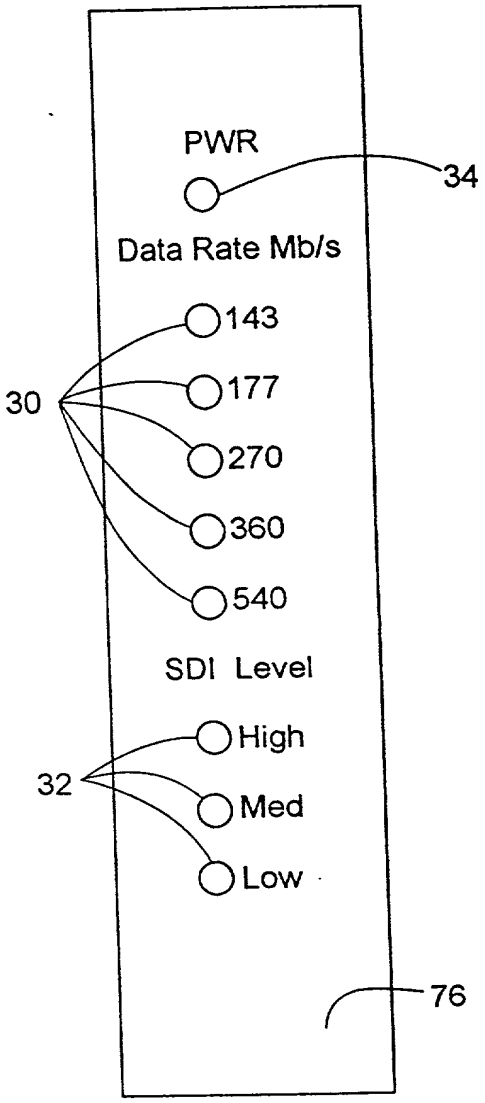

Figure 4

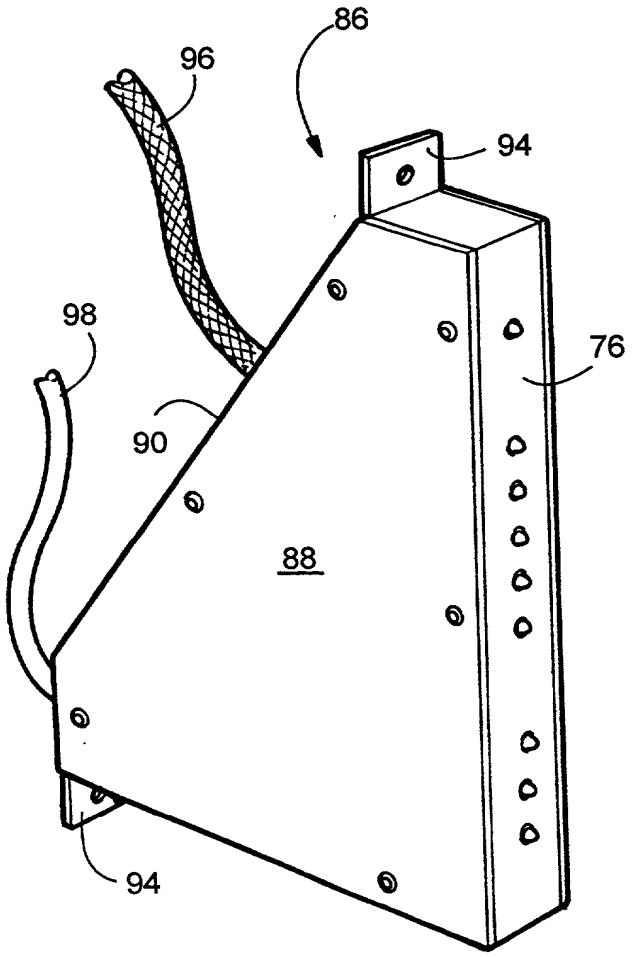

Figure 5

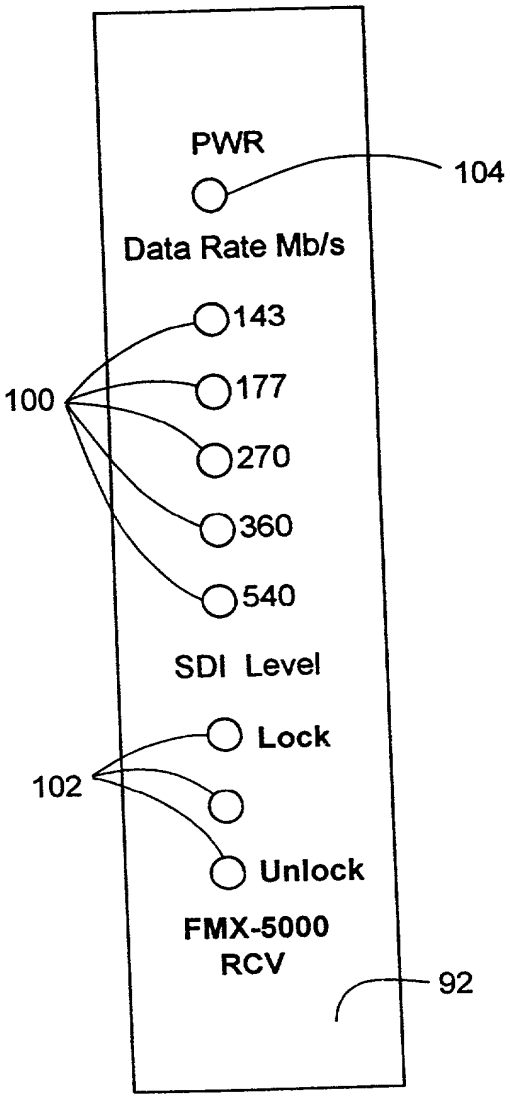

Figure 6

Attorney's Docket No. 1961-PAT

COMBINED DECLARATION AND POWER OF ATTORNEY

(ORIGINAL, DESIGN, NATIONAL STAGE OF PCT, SUPPLEMENTAL, DIVISIONAL, CONTINUATION OR CIP)

As a below-named inventor, I hereby declare that:

TYPE OF DECLARATION

This declaration is of the following type: (check one applicable item below)

☒ Original

☐ Design

☐ Supplemental

NOTE: If the declaration is for an International Application being filed as a divisional, continuation or continuation-in-part application do not check next item; check appropriate one of last three items.

☐ National Stage of PCT

NOTE: If one of the following 3 items apply, then complete and also attach ADDED PAGES FOR DIVISIONAL, CONTINUATION OR C-I-P.

☐ Divisional

☐ Continuation

☐ Continuation-In-Part (C-I-P).

INVENTORSHIP IDENTIFICATION

WARNING: If the inventors are each not the inventors of all the claims, an explanation of the facts, including the ownership of all the claims at the time the last claimed invention was made, should be submitted.

My residence, post office address and citizenship are as stated below, next to my name. I believe that I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter that is claimed, and for which a patent is sought on the invention entitled:

TITLE OF INVENTION

FIBER OPTIC VIDEO TRANSMITTER AND RECEIVER SYSTEM

SPECIFICATION IDENTIFICATION

the specification of which:
(complete (a), (b) or (c))

(a) ☒ is attached hereto.

(b) ☐ was filed on _____ as

☐ Serial No. _____ or

☐ Express Mail No., as Serial No. not yet known _____ and was amended on _____ (if applicable).

NOTE: Amendments filed after the original papers are deposited with the PTO which contain new matter are not accorded a filing date by being referred to in the declaration. Accordingly, the amendments involved are those filed with the application papers or, in the case of a supplemental declaration, are those amendments claiming matter not encompassed in the original statement of invention or claims. See 37 CFR 1.67.

(c) ☐ was described and claimed in PCT International No._____ filed on _____ and as amended under PCT Article 19 on _____ (if any).

ACKNOWLEDGMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37, Code of Federal Regulations § 1.56,
(also check the following items, if desired)

☐ and which is material to the examination of this application, namely, information where there is a substantial likelihood that a reasonable Examiner would consider it important in deciding whether to allow the application to issue as a patent, and

☐ In compliance with this duty, there is attached an information disclosure statement, in accordance with 37 CFR 1.98.

PRIORITY CLAIM

I hereby claim foreign priority benefits under Title 35, United States Code, § 119(a)-(d) of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international applications(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

(complete (d) or (e))

(d) ☒ no such applications have been filed.

(e) ☐ such applications have been filed as follows.

NOTE: Where item (c) is entered above and the International Application which designated the U.S. itself claimed priority check item (e), enter the details below and make the priority claim.

PRIOR FOREIGN/PCT APPLICATION(S) FILED WITHIN 12 MONTHS (6 MONTHS FOR DESIGN) PRIOR TO THIS APPLICATION AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. § 119(a)-(d)

COUNTRY (or indicate if PCT)	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 37 USC 119

CLAIM FOR BENEFIT OF PRIOR U.S. PROVISIONAL APPLICATION(S)
(34 U.S.C. § 119(e))

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below:

PROVISIONAL APPLICATION NUMBER FILING DATE

_____ / _____ _____

_____ / _____ _____

_____ / _____ _____

CLAIM FOR BENEFIT OF EARLIER US/PCT APPLICATION(S) UNDER 35 U.S.C. 120

☐ The claim for the benefit of any such applications are set forth in the attached ADDED PAGES TO COMBINED DECLARATION AND POWER OF ATTORNEY FOR DIVISIONAL, CONTINUATION OR CONTINUATION-IN-PART (C-I-P) APPLICATION.

ALL FOREIGN APPLICATION(S), IF ANY, FILED MORE THAN 12 MONTHS (6 MONTHS FOR DESIGN) PRIOR TO THIS U.S. APPLICATION

NOTE: If the application filed more than 12 months from the *filing* date of this application is a PCT filing forming the basis for this application entering the United States as (1) the national stage, or (2) a continuation, divisional, or continuation-in-part, then also complete ADDED PAGES TO COMBINED DECLARATION AND POWER OF ATTORNEY FOR DIVISIONAL, CONTINUATION OR C-I-P APPLICATION for benefit of the prior U.S. or PCT application(s) under 35 U.S.C. § 120.

POWER OF ATTORNEY

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (List name and registration number)

FRANK D. GILLIAM — REG NO. 26,548
4565 Ruffner Street, Ste. 200
San Diego, CA 92111

JOHN R. DUNCAN — REG NO. 22,276
4565 Ruffner Street, Ste. 200
San Diego, CA 92111

DONN K. HARMS — REG NO. 38,911
4565 Ruffner Street, Ste. 200
San Diego, CA 92111

(check the following item, if applicable)

☐ Attached, as part of this declaration and power of attorney, is the authorization of the above-named attorney(s) to accept and follow instructions from my representative(s).

SEND CORRESPONDENCE TO:	DIRECT TELEPHONE CALLS TO:
FRANK D. GILLIAM 4565 Ruffner Street, Ste. 200 San Diego, CA 92111	FRANK D. GILLIAM Tel (858) 292-0901 Fax (858) 292-0905

DECLARATION

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

SIGNATURE(S)

NOTE: Carefully indicate the family (or last) name, as it should appear on the filing receipt and all other documents.

Full name of sole or first inventor DAVID CAIDAR

Inventor's signature ______

Date May 11/2000 Country of Citizenship THE UNITED STATES OF AMERICA

Residence 6046 Cornerstone Court West, Ste. 209, San Diego, CA 92121

Post Office Address 6046 Cornerstone Court West, Ste. 209
San Diego, CA 92121

Full name of second joint inventor, ABRAHAM ELMALEH

Inventor's signature ______

Date 5/11/00 Country of Citizenship THE UNITED STATES OF AMERICA

Residence 6940 Weller Street, San Diego, CA 92122

Post Office Address 6940 Weller Street, San Diego, CA 92122

09579584.052300

(check proper box(es) for any of the following added page(s) that form a part of this declaration)

☐ **Signature** for fourth and subsequent joint inventors.
Number of pages added _____.

* * *

☐ **Signature** by administrator(trix), executor(trix) or legal representative for deceased or incapacitated inventor.
Number of pages added _____.

* * *

☐ **Signature** for inventor who refuses to sign or cannot be reached by person authorized under 37 CFR 1.47.
Number of pages added _____.

* * *

☐ Added page for **signature** by one joint inventor on behalf of deceased inventor(s) where legal representative cannot be appointed in time. (37 CFR 1.47)

* * *

☐ Added pages to combined declaration and power of attorney for divisional, continuation, or continuation-in-part (C-I-P) application.

☐ Number of pages added _____.

* * *

☐ Authorization of attorney(s) to accept and follow instructions from representative.

If no further pages form a part of this Declaration then end this Declaration with this page and check the following item

☒ This declaration ends with this page